DRUG ERROR: METARAMINOL BOLUS

MODULE: PATIENT SAFETY

TARGET: ALL ANAESTHETISTS

BACKGROUND:
Medication errors present a particular hazard to patients. Anaesthetists handle and administer numerous drugs with potentially significant adverse effects, often in a distraction-filled environment. There has been a relatively poor safety culture with regard to drug error prevention in anaesthesia although this is improving. This scenario is based around three separate but similar serious untoward incidents (SUIs) that occurred at our Trust, where a large bolus of Metaraminol was inadvertently administered during general anaesthesia. These SUIs led to systemic changes in the way Metaraminol was procured, packaged, handled and drawn up in theatres and critical care areas.
RELEVANT AREAS OF THE ANAESTHETIC CURRICULUM

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- Demonstrates optimal patient position for airway management  
- Manages airway with mask and oral/nasopharyngeal airways  
- Demonstrates hand ventilation with bag and mask  
- Able to insert and confirm placement of a Laryngeal Mask Airway  
- Demonstrates correct head positioning, direct laryngoscopy and successful nasal/oral intubation techniques and confirms correct tracheal tube placement  
- Demonstrates proper use of bougies  
- Demonstrates correct securing and protection of LMAs/tracheal tubes during movement, positioning and transfer  
- Correctly conducts RSI sequence  
- Correctly demonstrates the technique of cricoid pressure |
| IO_BS_08 | Communicates with the theatre team in a clear unambiguous style |
| IO_BS_09 | Able to respond in a timely and appropriate manner to events that may affect the safety of patients [e.g. hypotension, massive haemorrhage][S] |
| ES_BS_03 | Manages rapid sequence induction in the high risk situation of emergency surgery for the acutely ill patient |
| CI_BK_09 | Unexpected hypertension |
| CI_BK_11 | Arrhythmias:  
- ST segment changes  
- Sudden bradycardia  
- Ventricular ectopics |
| CI_BK_22 | Adverse drug reactions |
| CI_BS_01 | Demonstrates good non-technical skills such as: [effective communication, team-working, leadership, decision-making and maintenance of high situation awareness] |
| CI_BS_02 | Demonstrates the ability to recognise early a deteriorating situation by careful monitoring |
| CI_BS_03 | Demonstrates the ability to respond appropriately to each incident listed above |
| CI_BS_04 | Shows how to initiate management of each incident listed above |
| CI_BS_05 | Demonstrates ability to recognise when a crisis is occurring |
| CI_BS_06 | Demonstrates how to obtain the attention of others and obtain appropriate help when a crisis is occurring |
| CI_IS_01 | Demonstrates leadership in resuscitation room/simulation when practicing response protocols with other healthcare professionals |
| CI_IS_02 | Demonstrates appropriate use of team resources when practicing response protocols with other healthcare professionals |
INFORMATION FOR FACULTY

LEARNING OBJECTIVES:
- Learn how to approach the management of unexpected hypertension under anaesthesia
- Understand the factors that can contribute to drug errors occurring
- Understand how systems can be put in place to reduce the risk of harm to patients from drug errors

SCENE INFORMATION:
- Location: Anaesthetic Room / Theatre
- Expected Duration of Scenario: 20 mins
- Expected Duration of Debrief: 40 mins

EQUIPMENT & CONSUMABLES

- Manikin
- Stocked airway trolley
- Simulated drugs for induction (thiopentone/propofol, suxamethonium, fentanyl, atracurium), anti-emesis (ondansetron, dexametasone), analgesia (paracetamol, diclofenac, tramadol) antibiotics (augmentin, gentamicin), emergency (suxamethonium, atropine, metaraminol, ephedrine) Empty metaraminol vial (10mg in 1ml)
- Surgical drapes
- Simulated surgical equipment (e.g. instrument trolley, diathermy, suction etc)

PERSONS REQUIRED

- Anaesthetic Junior Trainee
- Anaesthetic Assistant
- Anaesthetic Senior Trainee
- Scrubs Nurse (Optional)
- Surgeon (Optional)
- Runner (Optional)

PARTICIPANT BRIEFING: (TO BE READ ALOUD TO PARTICIPANT)

You are about to anaesthetise this 52 year old patient for a open appendicectomy. They are usually fit and well, but have had 5 days of right iliac fossa pain, with vomiting and fevers. They have a raised white cell count and CRP. Ultrasound is suggestive of an appendix inflammatory mass, and so has opted for an open approach (rather than laparoscopic).

The patient is fasted, but has had vomiting in the last 2 hours. There are no allergies known. Their airway examination is unremarkable.

Please conduct their anaesthetic.

‘VOICE OF MANIKIN’ BRIEFING:

You are a 52 year old who is usually well with no medical problems. Over the last five days you’ve had worsening pain in the right lower quarter of your abdomen. In the last 2 days this has worsened significantly and you’ve had fevers and vomiting.

You have no allergies and take no regular medications.

You are about to undergo an appendicectomy. You haven’t been offered any analgesics, and you are in considerable pain.
‘IN SCENARIO PERSONNEL’ BRIEFING:

ANAESTHETIC ASSISTANT
Help the anaesthetist induce the patient, and then help the theatre team prepare to start operating.

Once the blood pressure problems occur, if not instructed to do so, leave the theatre area to ‘check the drug vials’. Return after a few minutes with the empty 10mg metaraminol vial and explain that it can’t be accounted for amongst all the empty vials it has possibly been drawn up and administered in error.

SURGICAL TEAM
Once induction has take place, prep and drape the patient in preparation for surgery. Once the WHO timeout has been completed the surgeon starts.

Early during the surgery the blood pressure will rise and heart rate fall; continue the surgery unless the anaesthetist asks you to stop. If this occurs, wait around one minute before becoming impatient to restart
CONDUCT OF SCENARIO

INITIAL SETTINGS

A: Own
B: RR 20. SpO2 98%.
C: HR 105. BP 105/70
E: Temp 38.6. Surgical site marked in RIF.

EXPECTED ACTIONS

• Prepare for RSI
• Preoxygenate
• Perform Safe RSI

RAPID SEQUENCE INDUCTION

A: Intubated.
B: SpO2 99%. RR as per ventilator settings.
C: BP 90/60. HR 90.
E: Temp 38.6.

EXPECTED ACTIONS

• Maintain anaesthesia
• Let the surgical team start after the WHO timeout (reminder of need for antibiotics pre-incision)
• Proceed to give antibiotics, anti-emetics and analgesics.

ADDITIONAL INFO

A few minutes after the BP increase occurs, the ODP enters theatre from the anaesthetic room, and shows an empty 10mg metaraminol vial that can’t be accounted for – it’s possible it was drawn up accidentally.

BP RISE

B: SpO2 96%.
C: BP 240/130 over 3 mins. HR 40 over 6 mins. ST depression develops 5 mins after BP surge, if appropriate management does not occur, ST elevation occurs after further 5 mins

EXPECTED ACTIONS

• Give analgesia e.g. fentanyl/alfentanil
• Increase anaesthetic depth
• Inform surgical team and stop surgery. Call for help
• Consider glycopyrolate/atropine
• Check for drug errors (check with ODP also)
• Consider hypotensive agents: GTN, labetalol/propranolol (but note bradycardia), clonidine, phentolamine, hydralazine, or nifedipine.
• Consider invasive arterial BP monitoring

LOW DIFFICULTY

• Hypertension is transient and settles after 10 mins. ECG changes settle spontaneously

NORMAL DIFFICULTY

• With appropriate management, BP and HR settle but ECG changes persist.
• Surgeon very upset about being kept waiting

HIGH DIFFICULTY

• Persistent high BP throughout scenario despite all treatments
• Surgeon aggressive about being asked to stop surgery

RESOLUTION

Once BP starts the settle or once appropriate post-operative plan is made
**PATIENT DETAILS / ADDRESSOGRAPH**

- **Hospital No.**
- **SURNAME:** Leslie Warren
- **BLOCK LETTERS:** 
- **FORENAME:** 52 years old
- **Address:** Ward/Hosp.
- **DOB:** Sex: M / F

**Procedure[s] proposed:**
Open Appendicectomy

**CEPOD CLASS:** ELECTIVE / SCHEDULED / URGENT / EMERGENCY

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**Anaesthetist's preoperative assessment by**

<table>
<thead>
<tr>
<th>Name:</th>
<th>Grade:</th>
<th>Date:</th>
<th>Time:</th>
<th>Signature</th>
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**Anaesthesia / Surg history:**
- No previous GAs

**Medical history:**
- No medical history of note
- 5 days of pain, 2 days of vomiting and fevers
  - Vomited 2 hours ago

**O/E**
- **Unremarkable**

**AIRWAY ASSESSMENT**
- **Mouth Opening:**
  - MP Score: 1 2 3 4
- **Jaw:** Good mouth opening
- **Neck:** Neck ROM OK

**TEETH**
- 87654321 12345678
- 87654321 12345678
- X = missing
- L = loose
- B = bridge
- C = caps / crowns
- D = damaged

**ALLERGIES**
- **NKDA**
- **Probable inflammatory mass in RIF**

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**NBM since**
- **Solids:** Fasted for 6 hrs
- **Clear Fluids:**
- **Pregnancy:**
- **Lactation:**

**Relevant Medication:**
- **Nil**

**VTI Risk:**
- **High**
- **Low**

**INVESTIGATIONS**
- **Haematology**:
  - Hb 14
  - WCC 16
  - Plt 203
- **Biochemistry**:
  - U & E
  - K 5.1
  - Ur 7
  - Cr 103
  - Blood Sugar:
- **Coag.**
- **ECG**
- **Gp. & Save**
- **Spinal**
- **Regional**
- **Suppository**

**CONSENT:**
- **GA**
- **Sedation**
- **Epidural**
- **Spinal**
- **Regional**
- **Suppository**

**Other:**

**Notes / Discussion / Technique proposed:**
Consented for GA with LMA + RHS femoral nerve block
- Risks explained and consented

**Anaesthetic Information leaflet received by patient**

**For attention of ward staff:** (further investigations, fasting, continue/omit current medication, etc.)

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All orders / information regarding medication & fluids must be entered on patient's drug prescription & administration record.
**Anaesthesia**

**Patient Safety**

**Scenario 3**

**Relevant Information**

- **Supervising Anaesthetic Consultant (S-AC):**
  - Name:
  - Location of S-AC:
    - In Theatre
    - In Th Complex
  - Discussed With S-AC:
- **Airway & Size**
  - Mask
  - Nasal
  - Oral
  - LMA
- **Breathing System**
  - Bain
  - T-Piece
  - Circle + Absorber
- **Tracheal Intubation**
  - Oral
  - Tracheostomy
- **Monitoring**
  - SpO2
  - ECG
  - NIBP
  - ETCO2
  - F1O2
  - Anaes. Vapour
  - Disconnection
  - Airway Press.
  - Nerve Stim.
  - Temperature

**Drugs**

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<thead>
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<th>Drug</th>
<th>Time (units)</th>
<th>Total Dose</th>
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</thead>
</table>

**Oxygen**

- **F1O2**
- **L/min**

**N2O / Air / Total Gas Flow**

- **%**
- **L/min**

**Iso / Sevo / Des**

- **E1%**
- **Mac**

**Ventilation Mode**

- **SV, VC, PCV, Jet, etc.**

**Freq**

- **/ min**

**Tidal Volume**

- **ml**

**Paw**

- **cm H2O**

**Peep**

- **cm H2O**

**Events**

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<th>Event No.</th>
<th>100</th>
<th>250</th>
<th>200</th>
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<tbody>
<tr>
<td>SpO2</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR</td>
<td>150</td>
<td></td>
<td></td>
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<tr>
<td>Sys BP</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dia BP</td>
<td>50</td>
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</tr>
<tr>
<td>A</td>
<td>0</td>
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**Position Of Patient**

- **Supine**
- **Prone**
- **L-Lateral**
- **R-Lateral**
- **Lithotomy**
- **DHS Table**
- **Deck Chair**

**Tourniquet (site / times)**

- **Site:**
- **On:**
- **Off:**

**DVT Prophylaxis**

- **Heparin**
- **Rivaroxaban**
- **TEDS**
- **IC Boots**

- **E1CO2**
- **IV Fluids**
- **Blood Loss**
- **Urine Out**

**Comments:**

**Post Op / recovery instructions:**

**Anaesthetic Record Entered By:**

- **Name:**
- **Grade:**
- **Signature:**
DEBRIEFING

POINTS FOR FURTHER DISCUSSION:

- Learn how to approach the management of unexpected hypertension under anaesthesia
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DEBRIEFING RESOURCES

1. World Anaesthesia Tutorial of the Week: Hypertension in Anaesthesia

   [http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1744002/pdf/v014p00e12.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1744002/pdf/v014p00e12.pdf)


INFORMATION FOR PARTICIPANTS

KEY POINTS:
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PARTICIPANT REFLECTION:

What have you learnt from this experience? (Please try to list 3 things)

How will your practice now change?

What other actions will you now take to meet any identified learning needs?
PARTICIPANT FEEDBACK

Date of training session: ..................................................................................................................

Profession and grade: ........................................................................................................................

What role(s) did you play in the scenario? (Please tick)

Primary/Initial Participant

Secondary Participant (e.g. ‘Call for Help’ responder)

Other health care professional (e.g. nurse/ODP)

Other role (please specify):

Observer

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
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</thead>
<tbody>
<tr>
<td>I found this scenario useful</td>
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<tr>
<td>I understand more about the scenario subject</td>
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<tr>
<td>I have more confidence to deal with this scenario</td>
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<tr>
<td>The material covered was relevant to me</td>
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Please write down one thing you have learned today, and that you will use in your clinical practice.

How could this scenario be improved for future participants?

(This is especially important if you have ticked anything in the disagree/strongly disagree box)
What went particularly well during this scenario?

What did not go well, or as well as planned?

Why didn’t it go well?

How could the scenario be improved for future participants?